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New records and a significant range extension of the recently described *Pelexia vinosa* A.W.C. Ferreira, M.I.S. Lima & Pansarin (Orchidaceae) in southernmost Brazil

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Abstract

We present new records for *Pelexia vinosa* A.W.C. Ferreira, M.I.S. Lima & Pansarin, a Brazilian terricolous orchid described in 2012 and at that moment known only from the type population and considered endemic to the state of São Paulo. We report the occurrence of populations in seasonal semideciduous forest fragments at three locations in the southernmost Rio Grande do Sul state, Brazil. This would mean that the species distribution is extended by ca. 1,500 km in a straight line from previous records. We also reassess the conservation status of *P. vinosa* as Endangered.

Keywords

Conservation status, flora of Rio Grande do Sul, Pampa phytogeographical domain, seasonal semideciduous forest, Spiranthinae

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Introduction

Pelexia Poit. *ex* Lindl. *s.l.* is a genus of terricolous, rupicolous, or rarely epiphytic orchids native to the American tropics and subtropics with approximately 77 species (Chase et al. 2015). However, species belonging to *Pelexia s.s.* are fewer in number according to a recent molecular phylogenetic study by Salazar et al. (2018), in which *Pelexia* emerges as polyphyletic. Those authors consistently recovered two clades, with one of them, *Pelexia s.s.*, largely corresponding to *Pelexia* section *Eupelexia*, as defined by Schlechter (1920).

Eight species of *Pelexia s.s.* occur in Brazil (Meneguzzo 2020). According to Pace (2020), several species of *Pelexia* have a restricted geographical distribution. However, this scarcity of records might be

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due more to insufficient sampling than to species rarity (Gomes et al. 2018). Until now, only three species of *Pelexia* have been reported from the state of Rio Grande do Sul: *P. lindmanii* Kraenzl., *P. macropoda* (Barb. Rodr.) Schltr., and *P. novofriburgensis* (Rchb.f.) Garay (Meneguzzo 2020).

Pelexia vinosa A.W.C. Ferreira, M.I.S. Lima & Pansarin was described by Ferreira et al. (2012). The type population was discovered in a semideciduous seasonal forest fragment in the municipality of Itirapina in central São Paulo state and in the transition between the Cerrado and Atlantic Forest phytogeographic domains (Ferreira et al. 2012). *Pelexia vinosa* was considered endemic to that area and, until now, its occurrence has been documented only from the type locality (Ferreira et al. 2012). Ferreira et al. (2012) classified the conservation status of this species as Vulnerable due to the species' only known habitat being surrounded by pastures and crop lands.

Pelexia vinosa has vegetative and floral characteristics that make it easily distinguishable from other species of the genus. The leaves, which remain during flowering, are dark purple with reddish margins, and the inflorescence is sparsely pubescent and reddish. The sepals are reddish and contrast with the hyaline white petals and labellum; the spur-like nectary is parallel and completely adnate to the ovary (Ferreira et al. 2012).

We report new records of *P. vinosa* which expand the known distribution of this species in Brazil. We also reassess its conservation status based on IUCN categories and criteria.

Methods

We found populations of *Pelexia vinosa* during botanical collection expeditions in semideciduous seasonal forest fragments in the municipalities of Pelotas, Arroio do Padre, and Morro Redondo in the southernmost part of the state of Rio Grande do Sul, Brazil (Fig. 1). The climate of the region is Cfa, humid subtropical, with hot summers and without a dry season, according to the Köppen classification (Alvares et al. 2013).

Due to the current conservation status for *P. vinosa*, we collected two leaves and one inflorescence to make a voucher that was deposited at Herbarium ECT (Herbarium Embrapa Clima Temperado) with accession number ECT0008945. The first author holds a collection license (no. 51993-2) issued by the Biodiversity Information and Authorization System (SISBIO) of the Chico Mendes Institute for Biodiversity Conservation (ICMBio), Ministry of the Environment of Brazil. We took photographic records of the collection sites, of the plant, and of flower details. Vegetative and floral characteristics were obtained from live specimens in their natural environment and from the specimen deposited at the ECT herbarium. The flowering period was followed in two plants in their natural environment. The identification was made based on the work of Ferreira et al. (2012) and the terminology used in the morphological description of the species follows Dressler (1981, 1993).

We searched for *P. vinosa* records in the work of Ferreira et al. (2012) and in the following online databases: SpeciesLink (http://splink.cria.org.br/), Reflora (http://reflora.jbrj.gov.br) and Global Biodiversity Information Facility (http://www.gbif.org/). Geographic coordinates and elevation were obtained in the field, with a Garmin GPSMAP64 GPS receiver using the WGS84 datum. We created a geographic distribution map by inserting the coordinates of the type locality (Ferreira et al. 2012) and the new records (Fig.1). We also calculated the Area of Occupancy (AOO; grid size = 4 km²) and the Extent of Occurrence (EOO). For EOO we used the minimum convex polygon method, as indicated by the IUCN (IUCN 2019). Spatial analysis (EOO and AOO) and the geographic distribution map were carried out using ArcGIS v. 10.2.2 (ESRI 2014). Finally, considering the new records, we reassessed the conservation status according to the IUCN categories and criteria (IUCN 2012, 2019).

Results

***Pelexia vinosa* A.W.C. Ferreira, M.I.S. Lima & Pansarin**, Novon 22 (2): 156 (2012)

Holotype. BRAZIL – **São Paulo** • Itirapina, Itaquerida da Serra; 22°20′S, 047°29′W; 860 m alt.; 18.II.2007; A.W.C. Ferreira leg. (UEC 148368); fl.

New records (Fig. 1). BRAZIL – **Rio Grande do Sul** • Pelotas, Triunfo; 31°22′48″S, 052°30′21″W; 300 m alt.; 05.VI.2020; T.D. Perleberg, D. Perleberg and D.L. Silva obs.; seasonal semideciduous forest fragment; four sterile individuals. • Morro Redondo, Colônia São Domingos; 31°34′17″S, 052°37′23″W; 170 m alt.; 04.III.2021; T.D. Perleberg and A.P. Thiel legs.; seasonal semideciduous forest fragment; two fertile individuals; ECT0008945 • Arroio do Padre; 31°26′60″S, 052°28′21″W; 300 m alt.; 27.VI.2017; G.C. Gomes, T.C. de Freitas and M. Molz obs.; semideciduous seasonal forest fragment; two sterile individuals.

Identification. Terricolous herb about 27 cm tall when in bloom. Leaves 2–6, basal, pseudopetiolate; blade 6.5–13.0 × 3.5–6.0 cm, dark purple and, lustrous adaxially, reddish purple and opaque abaxially, margin and central vein reddish, asymmetrically elliptical, margin smooth with some slightly crenulated regions; pseudopetiole canaliculate, 5.5–8.5 cm long. Inflorescence up to 27 cm long, racemose, erect, 5–35 flowers; scape reddish brown, pubescent. Flowers resupinate, pubescent; floral bracts 2.0–2.6 × 0.5 cm, reddish brown, acuminate, pubescent, longer than the ovary; dorsal sepal 1.3 × 0.4 cm, completely reddish-brown, fleshy; lateral sepals reddish-brown with white margin in the apical portion, fleshy, not decurrent, base adnate to the column foot and the ovary, forming a spurlike nectary; petals 1.2 × 0.2 cm, white with reddish-brown central vein, membranaceous, spatulate, adnate to the dorsal sepal involving the column; labellum 1.3 × 0.6 cm, white, fleshy, trilobed,

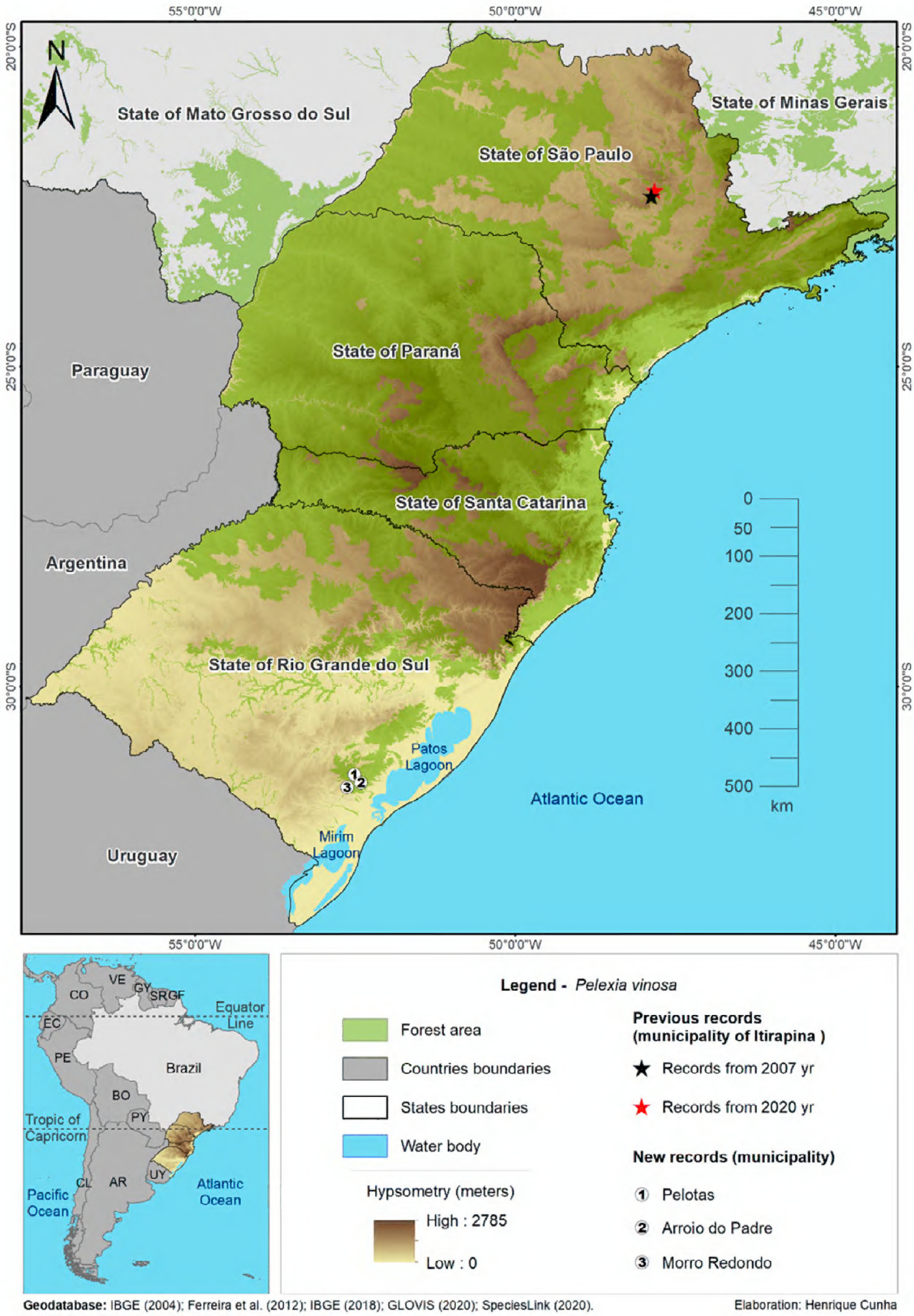

Figure 1. Geographic distribution of *Pelexia vinosa*: first collection record (black star) and new records in southern Brazil (circles with numbers) and São Paulo (red star).

canaliculate, with two projections in the basal portion; the apical portion of the dorsal sepal and lateral sepals, petals and the apical lobe of labellum with small hyaline glandular dots; column 1 cm long, white, with white rostellum and a yellow stigmatic surface; pollinarium with white pollinia and terminal, gray, lustrous viscidium (Fig. 2A–D).

Pelexia vinosa can be easily recognized by its leaves which are dark purple and lustrous adaxially and reddish purple and opaque abaxially, with margin and central vein reddish; and inflorescences reddish and pubescent. The sepals are reddish-brown and contrast with the labellum and petals which are whitish. The characteristics of the species recorded in the municipalities of Arroio

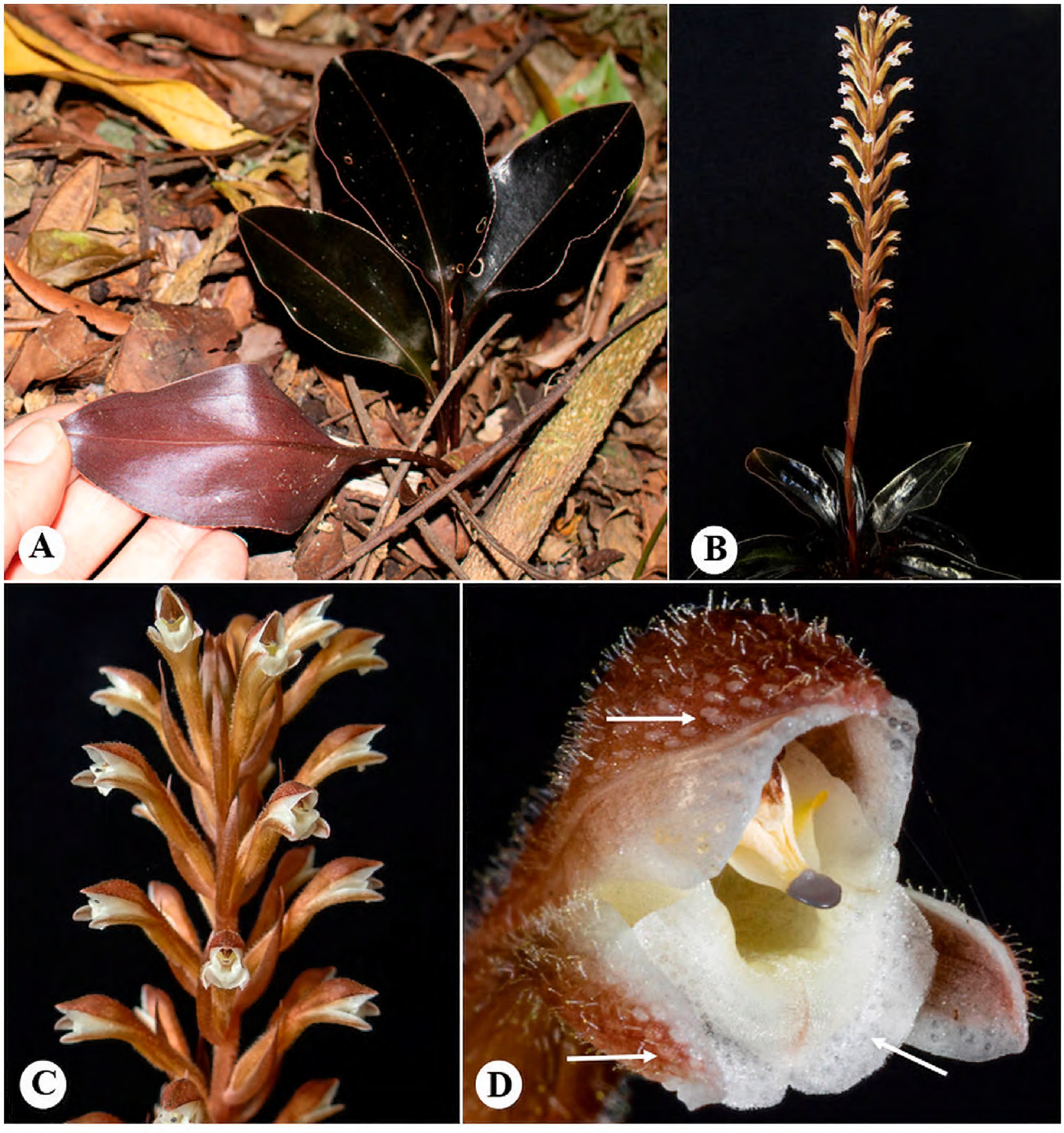

Figure 2. *Pelexia vinosa.* **A.** General view of the plant in natural habitat showing the difference in leaf color of the adaxial and abaxial surfaces. **B.** Flowering plant. **C.** Inflorescence. **D.** Flower with small hyaline glandular dots (shown by arrows).

do Padre, Morro Redondo, and Pelotas agree with the description by Ferreira et al. (2012). As noted by these authors and by us, the floral pieces of *P. vinosa*, including the lip, have small hyaline glandular dots at their apex (Fig. 2D).

According to Ferreira et al. (2012), *P. vinosa* resembles *Pelexia laxa* (Poepp. & Endl.) Lindl., from which it differs by some vegetative and floral characteristics. Some features are easily identified, such as macules on the leaf blades, which are present in *P. laxa* and absent in *P. vinosa;* the inflorescences, which are elongated and lax in *P. laxa* and more congested in *P. vinosa*; and the labellum, which is white with a median yellow spot in *P. laxa* and completely white in *P. vinosa*. So far, there are no records of *P. laxa* from the state of Rio Grande do Sul.

The species was observed with flowers in March. Fruits were not observed.

Distribution and conservation. Our research of online databases and the available literature resulted in collection records only from the municipality of Itirapina, state of São Paulo; this included the holotype used to describe the species (Ferreira et al. 2012) and two specimens entered in the SpeciesLink (2020) database as being grown in the living collection of the Orchidarium of the Laboratory of Molecular Biology and Plant Biosystematics at the University of São Paulo (records 712 and 713). The individuals of *P. vinosa* were found growing near a stream in gallery forest at an elevation of 860 m. The

locality where the species was collected is in the ecotone between cerrado vegetation and seasonal semideciduous forest.

The new records of *P. vinosa* are from well-preserved seasonal semideciduous forest fragments ranging from 0.8 to 0.10 km² (Fig. 3). The new sites range from 130 m (Morro Redondo) to 310 m (Arroio do Padre and Pelotas) of elevation. The species was found on slopes without nearby water bodies, and the forest fragments are all surrounded by cropland and pastures.

The EOO of *Pelexia vinosa* based on the new and previous records is 4,413.1 km², and the AOO is 20 km²

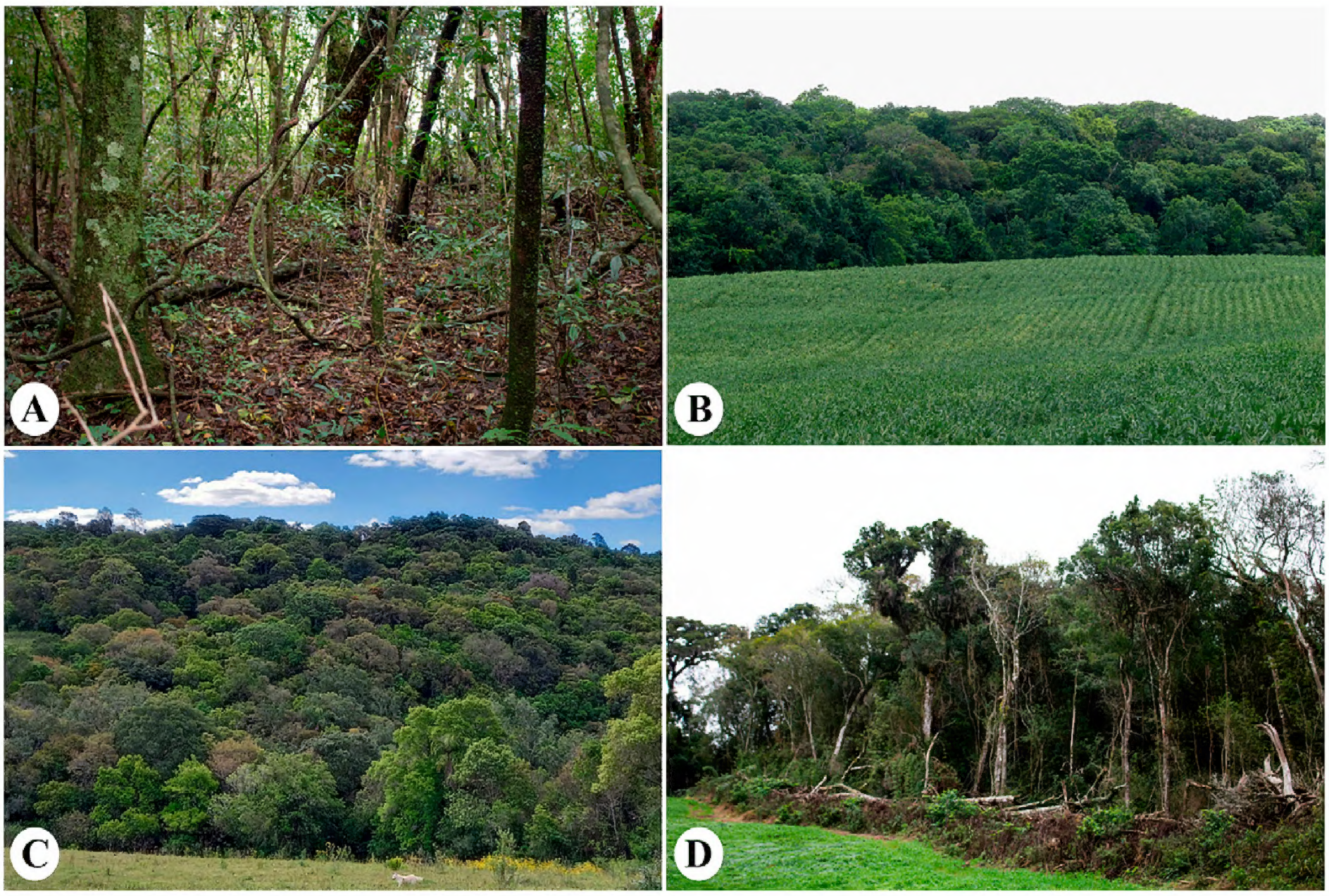

Figure 3. Habitat of *Pelexia vinosa*. **A.** Interior of Seasonal Semideciduous Forest fragment. **B–D.** External view of semideciduous seasonal forest fragments in Arroio do Padre (area: 0.8 km²) (**B**), Morro Redondo (0.10 km²) (**C**), and Pelotas (0.10 km²) (**D**).

Figure 4. Extent of Occurrence (EOO) and Area of Occupancy (AOO) of *Pelexia vinosa*.

(Fig. 4). The EOO is less than 5,000 km², and the AOO is less than 500 km²; the populations were found in severely fragmented forest areas.

Discussion

The discovery of *Pelexia vinosa* in southernmost Rio Grande do Sul extends the geographic distribution of the species by approximately 1,500 km of the type locality, showing the species is not restricted to the state of São Paulo, as previously supposed (Meneguzzo 2020). These records expand the list of plant species for the state of Rio Grande do Sul and the Pampa phytogeographic domain, demonstrating that *P. vinosa* has a broader range of distribution in Brazil and probably occurs in other seasonal semideciduous forest areas, especially in the states of Santa Catarina and Paraná. It is also evident that the species occurs at an elevation range from 130 m, in southernmost Rio Grande do Sul, to 860 m, in São Paulo. As with a recent rediscovery of the terricolous orchid *Habenaria dutrae* Schltr. (Gomes et al. 2018) in different vegetation formations in southern Rio Grande do Sul, this shows the need for more floristic studies in this region.

Evaluations of seed dispersal in terricolous orchids showed that the highest density of dispersed seeds is close to the mother plant. In some cases, 90–100% of the total seeds were recorded in distances of up to 2 m from the mother plant (Machon et al. 2003; Brzosko et al. 2017). The limited seed dispersion can make colonization of suitable habitats impossible, together with specific orchid characteristics, such as dependence on pollinators and mycorrhizal fungi, and the continuous environmental changes due to human action (fragmentation and isolation of habitats) are likely the main causes of orchid rarity (Brzosko et al. 2017).

Considering that *P. vinosa* has an EOO of less than 5,000 km² and an AOO of less than 500 km², with subpopulations consisting of at most five individuals, which occur in isolated forest fragments surrounded by cropland and pastures and subject to strong human pressure, we propose that the conservation status of this species is Endangered under B1ab(iii) + 2ab(iii); D or Critically Endangered under D; this species was previously assessed as Vulnerable by Ferreira et al. (2012).

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Authors' Contributions

Conceptualization: TDP. Formal analysis: TDP, HNC. Investigation: TDP, APT, GCG, HNC. Methodology: TDP, APT, GCG, HNC. Project administration: TDP. Supervision: TDP. Visualization: TDP, APT, GCG, HNC. Writing – original draft: TDP, GCG. Writing – review and editing: TDP, APT, GCG, HNC.

References

Alvares CA, Stape JL, Sentelhas PC, Gonçalves JLM, Sparovek G (2013) Köppen's climate classification map for Brazil. Meteorologische Zeitschrift 22 (6): 711–728. https://doi.org/f5v7ch

Brzoskol E, Ostrowiecka B, Kotowicz J, Bolesta M, Gromotowicz A, Gromotowicz M, Orzechowska A, Orzołek1 J, Wojdalska J (2017) Seed dispersal in six species of terrestrial orchids in Biebrza National Park (NE Poland). Acta Societatis Botanicorum Poloniae 86 (3): 1–14. https://doi.org/10.5586/asbp.3557

Chase MW, Cameron KM, Freudenstein JV, Pridgeon AM, Salazar G, Van Den Berg C, Schuiteman A (2015) An updated classification of Orchidaceae. Botanical Journal of the Linnean Society 177: 151–174. https://doi.org/10.1111/boj.12234

Dressler RL (1981) The orchids: natural history and classification. Harvard University Press, Cambridge, USA, 356 pp.

Dressler RL (1993) Phylogeny and classification of the orchid family. Dioscorides Press, Portland, USA, 314 pp.

ESRI (Enviromental Systems Research Institute) (2014) ArcGIS Desktop 10.2.2 Redlands, USA, CD-ROM.

Ferreira AWC, Lima MIS, Pansarin ER (2012) A new species of *Pelexia* (Orchidaceae, Spiranthinae) from São Paulo, Brazil. Novon 22 (2): 155–159. https://doi.org/10.3417/2010102

GLOVIS (2020) Global Visualization Viewer. United States Geological Survey, Virginia, USA. http://glovis.usgs.gov. Accessed on: 2020-10-15.

IBGE (Instituto Brasileiro de Geografia e Estatística) (2004) Vegetação – 1:250.000. https://www.ibge.gov.br/geociencias/informacoes-ambientais/vegetacao/22453-cartas-1-250-000.html?=&t=acesso-ao-produto. Accessed on: 2020-10-04.

IBGE (Instituto Brasileiro de Geografia e Estatística) (2018) Malhas territoriais. https://www.ibge.gov.br/geociencias/organizacao-do-territorio/malhas-territoriais.html. Accessed on: 2020-10-04.

IUCN (International Union for the Conservation of Nature) (2012) IUCN Red List Categories and Criteria: version 3.1. Second edition. IUCN, Gland, Switzerland and Cambridge, UK, 32 pp. https://portals.iucn.org/library/sites/library/files/documents/RL-2001-001-2nd.pdf. Accessed on: 2021-01-10.

IUCN Standards and Petitions Committee (2019) Guidelines for Using the IUCN Red List Categories and Criteria: Version 14. IUCN Standards and Petitions Committee, 113 pp. http://www.iucnredlist.org/documents/RedListGuidelines.pdf. Accessed on: 2021-01-10.

Gomes GC, Molina AR, Guarino, ESG, Freitas, TC, Perleberg TD (2018) New records and range extension of *Habenaria dutrae* Schltr. (Orchidaceae) in southern Rio Grande do Sul, Brazil. Check List 14 (6): 1083–1087. https://doi.org/10.15560/14.6.1083

Machon N, Bardin P, Mazer SJ, Moret J, Godelle B, Austerlitz F (2003) Relationship between genetic structure and seed and pollen dispersal in the Endangered orchid *Spiranthes spiralis*. New Phytologist 157: 677–687. https://doi.org/10.1046/j.1469-8137.2003.00694.x

Meneguzzo TEC (2020) *Pelexia* in flora do Brasil 2020. Jardim Botânico do Rio de Janeiro. http://floradobrasil.jbrj.gov.br/reflora/floradobrasil/FB11964. Accessed on: 2021-05-20.

Pace MC (2020) New species of *Microchilus* and *Pelexia* (Orchidaceae) from the Yungas and western Amazonia of Bolivia and Peru. Brittonia 72: 141–153. https://doi.org/10.1007/s12228-020-09612-1

Salazar GA, Batista JAN, Cabrera LI, van den Berg C, Whitten WM, Smidt EC, Chase MW (2018) Phylogenetic systematics of subtribe Spiranthinae (Orchidaceae: Orchidoideae: Cranichideae) based on nuclear and plastid DNA sequences of a nearly complete generic sample. Botanical Journal of the Linnean Society 186 (3): 273–303. https://doi.org/10.1093/botlinnean/box096

Schlechter R (1920) Versuch einer systematischen Neuordnung der Spiranthinae. Beihefte zum Botanischen Centralblatt 37: 317–454.

Sentinel-2 (2012) Sentinel Imagery. https://eos.com/sentinel-2/. Accessed on: 2020-10-19.

SpeciesLink (2020) http://splink.cria.org.br/. Accessed on: 2020-10-19.